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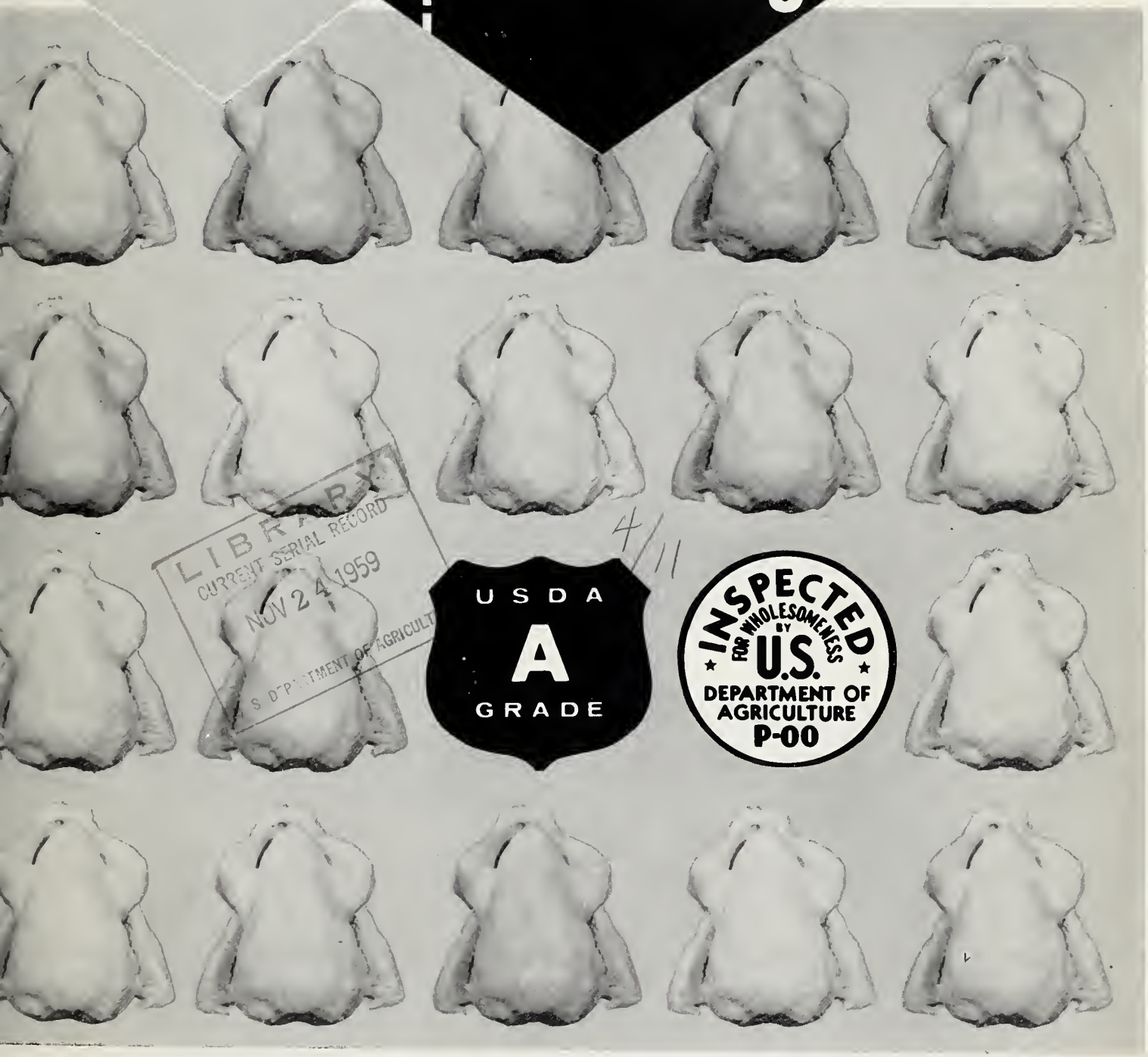

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In this issue

- More graded poultry moves to market
- Controls for grain aeration systems

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Editor, Milton Hoffman

Assistant editor, Jeanne Starr Park

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More Graded Poultry for retail stores

by Lester Kilpatrick

MORE graded poultry—in the stores and on the Nation's dinner tables—is in prospect in the years ahead.

The swing toward marketing poultry on the basis of U.S. grades has been accelerated during the past year chiefly because many more retailers have begun selling only USDA inspected and graded poultry and poultry parts.

This retailing policy has had a noticeable effect on the amount of broilers and fryers going through the U.S. grading program. (A large percentage of the turkeys sold at retail for years has been Federally graded.)

The poultry processor who employs the Government grading program enjoys many marketing advantages. In addition to being able to meet the requirements of stores which buy only graded poultry, he is able to compete in bidding on many city, county, State, and Federal contracts and on contracts to supply steamship lines, private hospitals, and other institutions which require graded poultry products.

The most important advantage, however, is the assurance grading offers to the consumer. The USDA grade mark is a symbol of quality that instills confidence and results in ready consumer acceptance of the products on which it appears.

Only ready-to-cook poultry which has been individually graded by a licensed employee may bear the USDA shield on its package. The package must also carry the USDA "Inspected for Wholesomeness" mark. Since January 1, 1959, Federal inspection for wholesomeness of all poultry and poultry products processed in plants engaged in interstate commerce has been required

The familiar Government grade shield is printed on the outer wrapping of frozen poultry and poultry parts. Fresh poultry carries the grade mark on a tag or metal clip, usually attached to the wing.

The USDA grade names for poultry—U.S. Grades A, B, and C—conform with the terminology used for numerous other food products. They may be applied to all kinds of domesticated poultry including chickens, turkeys, ducks, geese, guineas, and pigeons.

The quality standards for each grade are based on the shape or conformation of the bird, the amount of fleshing or "meatiness," the finish or amount of fat distributed in and under the skin, and appearance— freedom from bruises, discolorations, and pinfeathers.

U.S. Grade A, of course, is the finest quality. Birds of this grade have the highest proportion of edible meat and are practically free of dressing and other defects.

U.S. Grade B poultry is also of good table quality but may not be so well-fleshed as Grade A, or it may have some dressing defects.

U.S. Grade C poultry includes birds that have still less meat in proportion to bone and have meat of lower quality than birds in Grades A or B, or they may have more serious dressing defects than those in Grade B.

The use of Government grading services is relatively inexpensive. Processors involved in interstate commerce no longer have to pay for the Federal inspection which precedes grading. So, the only expense to the processor is that of the actual grading service.

The author is a marketing specialist in the Poultry Division of AMS.

Prepackaging Fresh Fruits and Vegetables

by Thomas B. Smith

ROUGHLY 30 percent of the fresh fruits and vegetables on the produce counters of retail stores in 1958 was prepackaged and wrapped in consumer-size units. Four years earlier only 20 percent came to the consumer already packaged.

A recent study by Agricultural Marketing Service researchers shows a continuing push toward more prepackaging in every section of the marketing system.

The growth of self-service retail markets has done much to stimulate this trend. So has the housewife's constant search for more convenience foods.

Throughout the marketing system, management is putting greater emphasis on the operating efficiency which prepackaging often makes possible and the savings which result from less spoilage and waste.

Prepackaging may occur anywhere along the marketing route—at the point of production, at the terminal market (either by specialized prepackagers or by service wholesalers), or at the retail store.

To get some sort of overall picture of the country's prepackaging operation, marketing specialists surveyed more than 200 plants. Most of these were located at terminal markets. Together they packaged 46 of the 100 or so most commonly marketed fruits and vegetables.

The kinds of packages used by these plants ranged from cellophane and polyethylene bags to cartons and trays, plastic baskets, and paper and mesh bags. The type of package chosen depended to a large degree on the commodity being packaged.

Most of the plants used a combination of manual and automatic packing lines. A few used exclusively one or the other.

About 75 percent of the commodities—including most of the leafy vegetables—were bagged and packaged by hand. Fruits and root vegetables proved the most adaptable to automatic packaging.

Types and sizes of packages are pretty well established for most commodities. For example, 10-ounce cellophane bags are usually used for spinach, and 1-pound polyethylene bags for carrots.

The complexity of the packaging operation varies with the commodity. Spinach and other leafy vegetables have to be graded carefully to remove damaged or immature leaves and foreign materials. They also have to be washed and dried before packaging. Many oranges, on the other hand, require nothing other than final packaging. They arrive at the packaging plant already graded and sized.

Throughout the country, plants are experimenting with new methods of packaging in new sizes and types of containers, with new machinery, and with new commodities.

Currently the plants, like the packages, come in all sizes, with a nearly unlimited range of automation. One of the plants surveyed had only one employee; another had 135. Similarly, the machinery and equipment in one plant cost about $50, while in another it was valued close to $138,000.

These are the extremes. Average investment in machinery and equipment came to $8,650 per plant.

In all of the plants, the trend toward expanded packaging operations is clearly evident. Everywhere, new and more efficient packages are being developed and used. Plants are turning more and more toward mechanization, and many different kinds of fruits and vegetables are now going into cartons and bags.

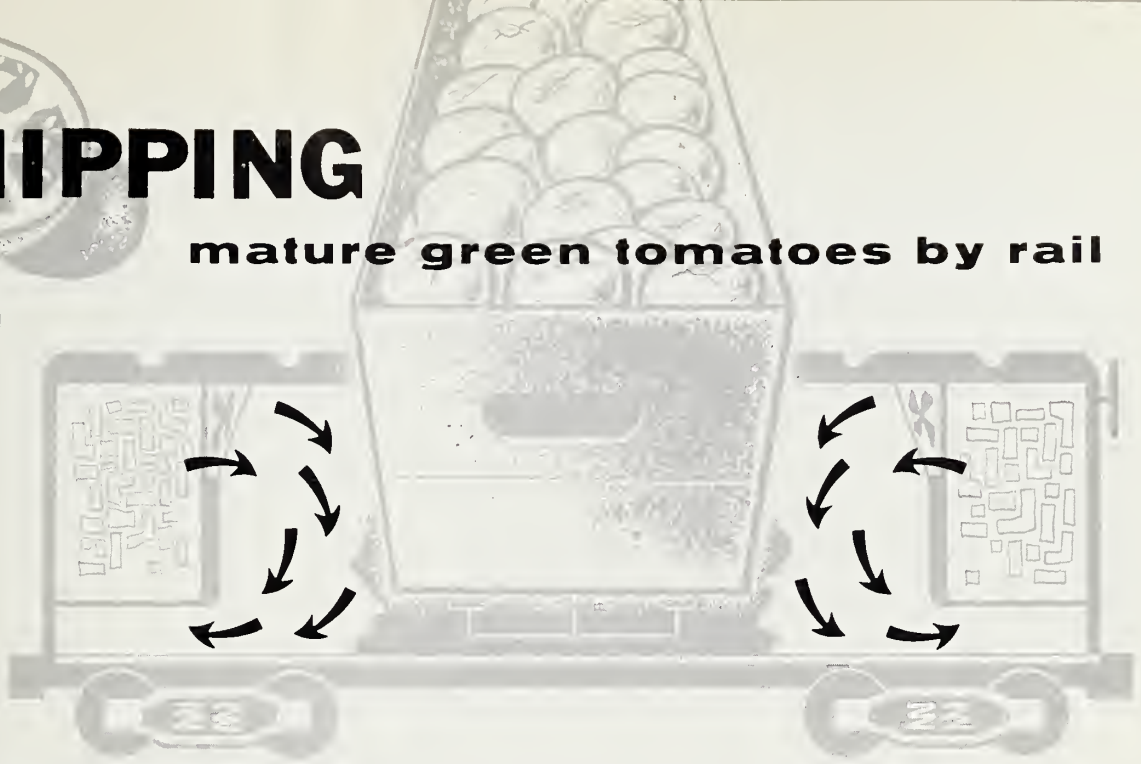
The prepackaging industry is doing many things to bring fresh fruits and vegetables to the consumer in better condition. With each improvement in its operation, costs are reduced for the entire food industry, and the consumer gets not only better produce but gets it at less cost.

The study on which this article is based is part of a broad program of AMS research aimed at expanding market outlets and reducing the costs of marketing farm products.

The author is a staff member of the Transportation and Facilities Research Division of AMS.

SHIPPING

mature green tomatoes by rail



TOMATOES shipped in mechanically refrigerated rail cars and in modified ice-bunker cars hold up better in transit and ripen faster at market than tomatoes shipped by old-type ice-bunker cars, according to a recent Agricultural Marketing Service study.

Both the mechanically refrigerated cars and modified ice-bunker cars studied offer thermostatic control. Such control is important in the shipment of mature-green tomatoes. Prolonged exposure at temperatures below 50° F. causes chilling injury which affects ripening and increases decay. Ideally, tomatoes should be held somewhere between 55° and 65° F.

AMS tests show that all modern refrigerator cars are capable of holding temperatures within this range. But, thermostatic temperature controls in the mechanical cars and ice cars eliminate the risk of chilling in transit.

Despite excessive icing during a cross country trip, the temperature of tomatoes shipped in a modified ice-bunker car was held close to the thermostatically set 55° F.

In the same tests, a mechanically refrigerated car also performed well. All layers of the load were cooled to the thermostat setting of 55° F. in a fairly short time, and they remained near this temperature for the rest of the trip.

In a conventional ice-bunker car, however, temperatures fluctuated with the ice supply. In some positions in the load, they dropped to as low as 50° F. following the icing and reicing operations.

These colder temperatures kept the tomatoes from ripening en route, whereas the controlled temperatures in the mechanical and modified ice-bunker cars permitted gradual ripening as the fruit moved to market.

In New York the tomatoes in the conventional car required two weeks' holding on track; those in the other two cars were ready for sale in 6 or 8 days. Because of their shorter holding period, the tomatoes from the mechanical and modified ice-bunker cars had less decay and went into the retail store in better condition.

During subseqent ripening at 70° F. at the retail market, tomatoes from the mechanical and modified ice-bunker cars continued to hold up better than those from the conventional railroad car.

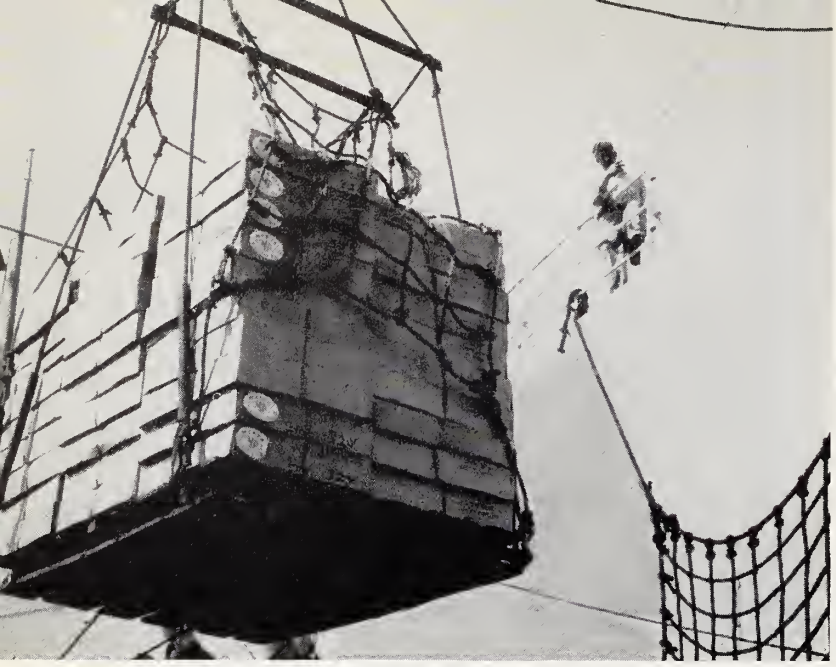
Exactly one month after they had arrived in New York, more than 93 percent of the tomatoes from the mechanical and modified bunker cars was considered in "passable" sale condition. About 88 percent of the conventional shipment met this qualification.

Some of the fruit from the ice-bunker car showed evidence of chilling. These tomatoes had been in the top and bottom layers of the load where temperatures dropped to 50° F. at times en route.

All test shipments were made with loads heavy enough to qualify for reduced freight rates. They contained mature-green Pearson tomatoes harvested from a single field and individually wrapped and packed in standard, wooden lug boxes. Lugs were stacked seven high in the cars.

Studies such as this—into the ways and means of maintaining the quality of farm products as they move through marketing channels—are part of the marketing research program of AMS. The constant search for improved transportation and handling methods brings better farm foods to market at lower cost—to the benefit of both the producer and the consumer.

This article is based on Marketing Research Report 349, "Transit Temperatures of California Mature Green Tomatoes." The research study was made by W. R. Barger, J. M. Harvey, and S. M. Ringel, all of the Market Quality Research Division.



Huge crone-load of frozen poultry is loaded in U. S. for overseas market.

AMS poultry inspection and grading service helps move huge Christmas shipment of U.S. frozen poultry abroad

700 Tons of Frozen Poultry Exported to Europe

The poultry was inspected and graded by AMS. At right, cartons of frozen chicken fryers are eased into ship's hold.

Off to Europe in time for Christmas dinner tables have gone 2,000 tons of frozen food from the U.S.A. Included are 700 tons of frozen poultry—all inspected for wholesomeness and graded for quality by the Poultry Division of the Agricultural Marketing Service, USDA.

The USDA inspection and grading service has done much to stimulate the use of U.S. frozen poultry abroad. It has earned for American poultry wide acceptance by European consumers.

This shipment of frozen chickens, however, is the largest ever to go abroad. As such, it marks a milestone for the poultry industry. It is a big step toward expanding foreign markets for American poultry.

Quality Eggs PAY OFF

by Robert M. Conlogue

MIDWESTERN egg assemblers can cut marketing costs as much as 6 cents a dozen by handling high-quality eggs and candling and cartoning them before they are shipped directly to retailers.

A recent Agricultural Marketing Service study shows that marketing costs of Midwestern eggs (excluding retailing) can be held to 12.2 cents if the eggs are precartoned at the point of production. Eggs shipped loose—and requiring candling and cartoning at the terminal market—cost 18.2 cents a dozen (excluding retailing costs).

Precartoning, however, depends on at least two things: the purchase of high quality eggs directly from farmers and a steady, dependable outlet for these eggs.

Unless there's a stable year-round market, the assembler cannot be assured of the 6-cent saving. And by the same token, unless the eggs are of top quality, the buyers will not benefit from the program.

Through a direct buying arrangement, assemblers can gauge their production and shipping requirements far in advance. The marketing process that results is more stable and less confusing; the eggs, less costly and of better quality.

Traditionally, eggs have been assembled in the production area then shipped in wholesale lots to dealers and chain store warehouses. There, the eggs are candled, cartoned, and sent to retail stores.

This means that often eggs are handled three or more times before finally reaching the retail outlet. Such multiple handling can be rough on eggs, which are particularly sensitive to heat, cold, dryness, and dampness.

Point-of-production cartoning reduces the number of times the eggs move from one temperature and humidity to another. It also eliminates much of the excess handling.

Some automatic assembly lines now move eggs at the rate of 7,200 an hour through the candling and cartoning operation when consistently top-quality eggs are handled.

Quality thus becomes the key to efficient preshipment candling and cartoning. It also is the key to better egg prices to producers.

If producers and assemblers can bring the grade of their eggs up to top standards (that is, U.S. Grade A), their product will become much more salable and the eggs they market generally will bring a premium price.

This was seen in a study of seven Midwestern assembly plants. When the producers who supplied eggs to these assemblers were divided into four groups (depending upon the percentage of Grade A eggs in their shipments), AMS researchers noted a definite correlation between the grade of the eggs and the return to the producer. Returns declined as the grades went down.

Using the group with the highest percentage of Grade A eggs as the model, market analysts calculated how much more each of the other three groups would have received were they, too, producing high yields of Grade A eggs.

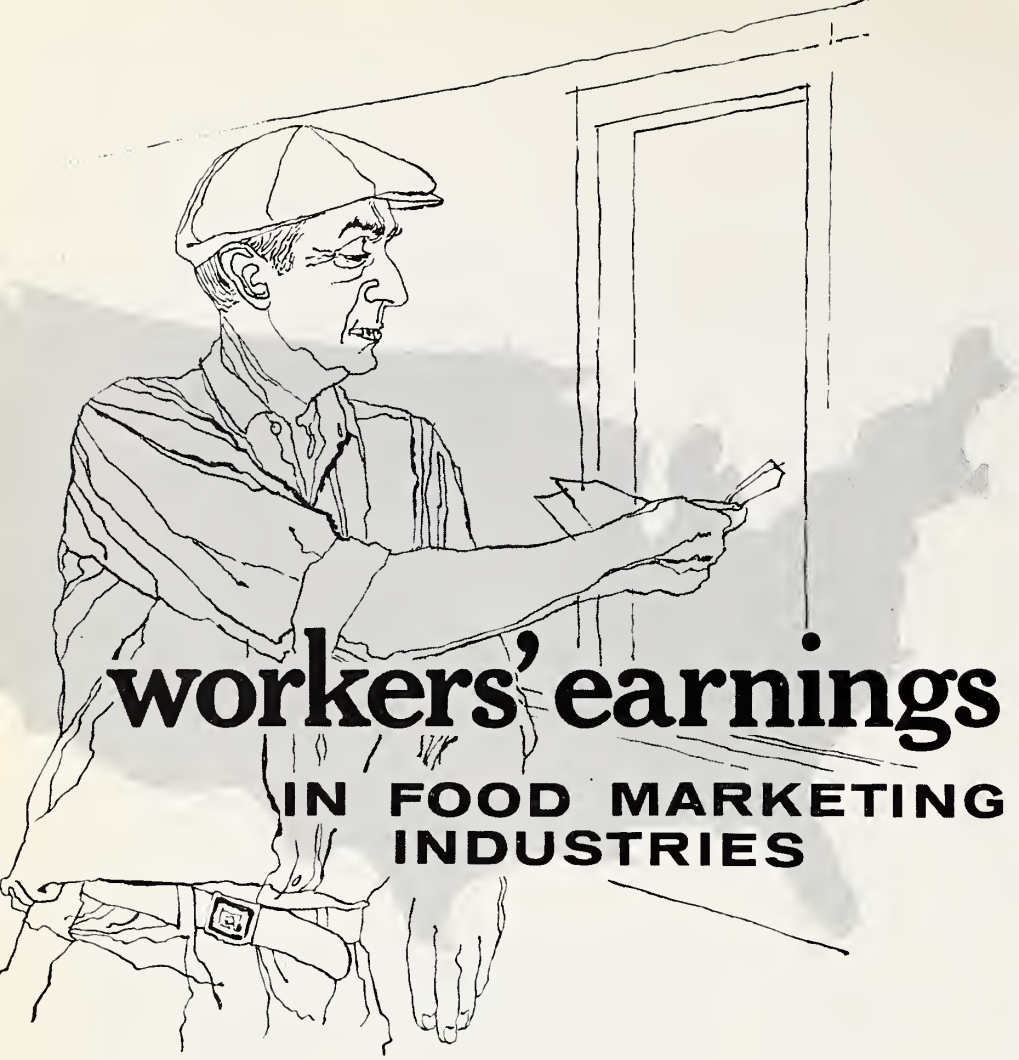
The second group would have earned 0.8 cent a dozen more for its eggs had they reached this quality level. Group 3 would have received 1.6 cents a dozen more, and Group 4 producers, 2.9 cents.

The high percentage of Grade A eggs in Group 1 also made it possible for eggs from these producers to be automatically candled and cartoned. These eggs were quickly moved by the case to the assembler, where they were run over a sizing machine and candled with a minimum of effort. They were immediately cartoned and made ready for shipment.

These high-quality eggs were capable of withstanding handling and hauling to distant markets without any appreciable loss in quality.

In contrast, eggs with Grade A yields ranging from 60 to 75 percent had to be handled more slowly, since many of them were on the borderline between A and B. The candler had to take more time with each egg to make sure the two grades were not mixed. Even so, many of the low Grade A eggs fell into the high B category by the time they reached their destination.

Mr. Conlogue is a staff member of the Marketing Economics Research Division of AMS. This article is based on his study, "Candling and Cartoning Eggs in Country Plants," MRR 366.



workers' earnings IN FOOD MARKETING INDUSTRIES

by Imogene Bright

REGIONAL differences in wage rates in the food processing and wholesaling industries are one cause of variations in labor costs between regions.

Since labor costs make up over half of the Nation's $31 billion food marketing bill, AMS is exploring the extent of differences in regional labor costs in food processing and wholesaling.

In 1958, average hourly earnings in food processing were lowest in the South and highest in the West. The difference between these two areas was 64 cents an hour for production workers in the processing industry and 83 cents an hour for nonsupervisory employees of merchant wholesalers handling groceries and food specialties.

The author is an agricultural economist in the Marketing Economics Research Division of AMS.

Within each of these industries, other wage differentials also exist. For example, there was a very noticeable difference between the wages paid workers in metropolitan and nonmetropolitan areas.

City people employed in the wholesale trade earned an average of 39 cents an hour more in May 1958 than the same workers in rural areas. Likewise, employees in the processing industry earned 36 cents an hour more if they worked in a city.

But wherever their place of employment—city or rural area, North, South, East, or West—production workers in the food processing industry had lower average hourly earnings than production workers in other manufacturing industries. For the country as a whole, this difference averaged 19 cents an hour.

The South again showed the largest difference. But it was followed closely by the West and North Central regions. While food processing workers in the South earned an average of 26 cents an hour less than those in manufacturing industries, those in the West earned 25 cents per hour less than Western production workers in manufacturing industries, and those in the North Central region earned 23 cents less than those in other industries of that region.

Only in the Northeast did the average wages of food processing workers come close to meeting those of similar workers in other industries. Here the difference was a scant 6 cents an hour.

Hourly earnings in the food processing and wholesaling industries, however, have increased in recent years. Between 1954 and 1958, average straight-time hourly earnings went up 30 cents.

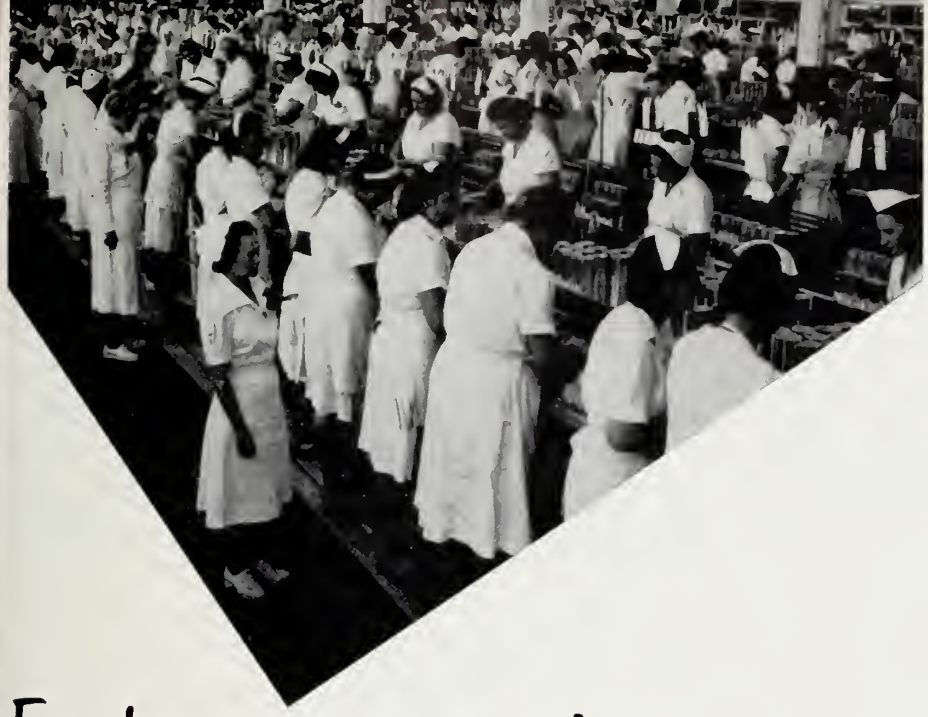
But while workers were earning more in 1958, they also were faced with higher living costs. Real wages—or earnings adjusted for price changes—did not change substantially over the period 1954-58. And this was true for each of the areas studied.

Basic information such as this—reported on a regional basis—can be of value to anyone interested in the marketing of farm products.

Marketing men will find it particularly useful when deciding what level of services can be provided for an area, and how to market their processed items.

Wage differences may also help the Government in locating areas to be assisted through the new Rural Development Program.

For a more complete account of the research that has been done on wage differentials, see "Differentials in Workers' Earnings in Selected Segments of Food Marketing," AMS-333. Single copies of this publication may be obtained without charge by writing: Marketing Information Division, Agricultural Marketing Service, USDA.



Factory processing of FARM FOODS

by William H. Waldorf

Factory production of processed domestic farm foods has increased an average of 2.6 percent a year in the past 50 years, significantly faster than our population has grown.

What's more, this long established trend has shown greater activity in recent years. Between 1909 and 1939 the average yearly growth of food manufacturing was 1.9 percent; since 1947 it has averaged 2.6 percent.

Three-fourths of the 50-year rise in food manufacturing can be linked with increased marketings by farmers. The remaining fourth is due to the greater amount of processing that foods now undergo and to the shift away from processing by retail and wholesale outlets and the farmer himself.

About 54 percent of the increase in processing costs (value added per unit of production) since the end of World War I has been due to expanded production of processed foods. The remaining 46 percent is the result of greater unit fabricating charges.

But, if we look at just the period since World War II, we see that rising unit processing charges have accounted for 54 percent of the rise in processing costs—exactly the reverse of the previous 40 years.

Today, factory processing charges account for only a third of the total marketing bill. Since 1919, these charges have taken a smaller and smaller share of this bill, primarily because other marketing costs have been growing faster than the costs of processing.

Per capitawise, factory production of domestic farm foods has risen 77 percent since 1909. It increased 18 percent during the first decade; 6 percent in the second; and 3 percent in the depression days of the 1930's. Then, between 1939 and 1947, per capita production rose 30 percent with another 5 percent increase since 1947.

This points up the close relationship between the growth of factory food production and the Nation's general economic activity. The sharpest relative increases occurred during times of strong wartime demand; the smallest increases came during the Great Depression.

The trend toward factory processing, however, has varied widely among the individual product groups. Indexes for dairy products and processed fruits and vegetables show the greatest change. Both of these products, as well as poultry and processed eggs, rose much faster than other processed foods.

In contrast, meat and bakery and grain mill products increased less than the all-industry average.

Aside from sugar and confectionery products, the groups that rose the fastest before World War II also rose the fastest after the war.

As a result of these divergent trends, the relative importance of red meats and food grain products has declined. At the same time, dairy products have increased in importance. So have processed fruits and vegetables.

The author is an economist in the Marketing Economics Research Division of AMS. His analysis is based on data compiled by the Bureau of the Census, USDA, and other agencies. This study is part of an AMS marketing research program to find out to what extent increases of marketing services per unit of product account for the increase in the marketing bill for farm products.

The Maine Potato Program

by William P. Charron

EACH year from the soil of Maine comes an abundant crop of potatoes.

Production is not much of a problem in Maine. Potato producers here have the know-how, and they use up-to-date production methods. But for potato growers everywhere, marketing the crop at reasonable prices is frequently another matter.

For several years the Maine Department of Agriculture, with funds supplied by the State and matched by the Federal government, has conducted a unique marketing program aimed at increasing the sale of Maine potatoes. The program has had six specific goals:

- To provide terminal receivers with more prompt and profitable services.
- To conduct a concentrated promotional campaign focused to the wholesale and retail trade.
- To promote the products of the potato processing industry.
- To sponsor in-State promotions, such as "Maine Potato Week."
- To encourage New England hotels and restaurants to use Maine potatoes for baking.
- To promote Maine potatoes at fairs, expositions, and trade meetings.

The campaign as been hard-hitting and inclusive. It was made possible through the Federal-State Matching Fund Program. Under this program, States wishing to participate are given financial assistance by the U.S. Department of Agriculture to improve their marketing service programs.

If a participating State sets aside $1,000 (for example) on a mutually agreed upon project aimed at improving the marketing of their farm products, USDA contributes an equal amount of money. The State uses the $2,000 to carry out its program.

The Agricultural Marketing Service helps the participating States plan their programs and gives counsel on particular problems. But the responsibility for program development rests with the States.

In effect, the Matching Fund Program helps State departments of agriculture work out special marketing problems. Sometimes these activities center on quality improvement (dairy products in Wisconsin), expanding outlets (as in Maine potatoes), improving efficiency (grain handling in North Carolina), or provides needed marketing information (quarterly sow farrowing estimates in 10 Corn Belt States).

Many different marketing problems for different farm products frequently are attacked in a single State. In fact, this often is the case.

In Maine last year, Matching Fund money went to marketing programs dealing with poultry, fluid milk, apples, dry beans, maple syrup, cream-style corn, blueberries, and red meats. The chief program, however, dealt with potatoes, Maine's chief crop.

The Maine potato marketing program is a well-organized and practical one designed to give the trade and the consumer a lot more services and a much better product. Quality is stressed at all times.

Maine marketing specialists visited 253 terminal markets in 26 States plus Washington, D.C., telling wholesalers and handlers about the latest methods of packaging, merchandising, and warehousing Maine potatoes. At the same time, they conducted intensive store-level promotions and served as merchandising consultants. The result—Maine potatoes enjoyed a 30- to 40-cent per hundredweight premium in many markets during the 1958-59 season.

As part of the overall potato promotion program, the Maine Potato Commission conducted an intensive advertising campaign. *No Federal funds were used in this advertising campaign.* It was a separate program. The results of the two programs were most favorable—carlot arrivals of Maine potatoes in Detroit were 51 percent greater than the previous year, 47 percent more in Baltimore, and up 35 percent in Pittsburgh.

At home, within Maine itself, the State Department of Agriculture got the public and industry to join in on this marketing program for potatoes. The potato industry knew what was expected of them and what help they in turn could expect. Bankers were asked to display potato posters. Radio and television stations were petitioned for public service time, and newspapers were barraged with recipes and feature stories—all about Maine potatoes.

The Governor proclaimed "Maine Potato Week," and the Post Office Department in Maine adopted a mailing cancellation that suggested everyone "Use More Maine Potatoes."

Maine Department of Agriculture and potato industry people made sure that elsewhere, across the Nation, consumers became familiar with the blue, white, and red State of Maine trademark on frozen french fry packages, on frozen potato snacks, even on the newly developed potato flakes.

This tie-in promotion by the Maine industry with various manufacturers brought Maine potatoes to the attention of the consumers.

(continued on page 16)

The author is assistant chief of the Division of Markets, Maine Department of Agriculture.

A Clamp for Potato Sacks

by Leonard Pawski and Albert Dubuque

A CLAMP made from a simple strap hinge and a small coil spring has been used successfully by AMS personnel at the Red River Valley Potato Research Center in Minnesota to reduce the amount of bruising incurred in bagging potatoes in packing plants.

The new gadget is called a sack clamp, and it fits any type of sack holder. Here's how it works.

A 100-pound burlap bag is hung on the bag holder along the conveyor belt packing line in the usual manner. One of the bottom corners is inserted in the clamp. In effect, this creates a smaller bag near the bag top, since the potatoes cannot fall into the tucked up portion.

Potatoes coming from the line then fall into the open top part of the sack and accumulate there temporarily. But after 40 or 50 pounds have collected, the clamp tucking up the rest of the bag is forced open by the weight of the potatoes. The bag falls free, thus opens its full length, and the potatoes already in it drop en masse to the bottom. The rest of the bag is then filled with potatoes falling from the conveyor line.

The initial, en masse fall drops the potatoes only 18 inches—instead of the full 36-inch length of the bag.

Their fall is broken by the end of the sack and a sponge rubber padding installed on the floor beneath. Because a mass of potatoes all drops at once to the bottom, the bag is automatically settled. There is little need to bounce or jiggle it to get a tight pack before the bag is stitched shut.

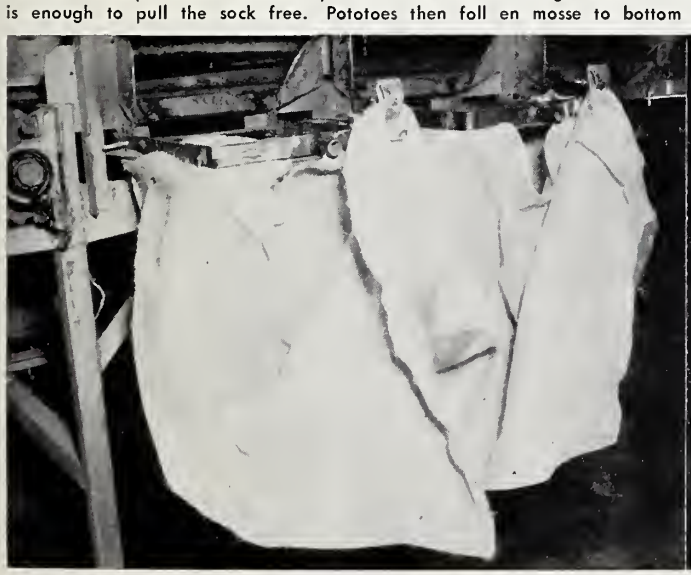
The sack clamp is made by bending one side of a steel strap hinge into the shape of a question mark. The unbent side of the hinge is then bolted onto a steel frame brazed to the sack holder with the coil spring inserted on the top mounting bolt.

The tension of the clamp may be adjusted by increasing or decreasing the tension on the spring.

To insert the corner of the bag into the sack clamp takes only 3 seconds. For this little extra work, warehousemen get a more salable product. The increased value of the potatoes more than offsets the cost of the clamp and the time it takes to tuck up each bag corner.

The authors are Department of Agriculture employees stationed at the Red River Valley Potato Research Center, East Grand Forks, Minn.

The sock clamp reduces distance pototoes foll into the bog. Bottom corner of sack is tucked into clamp, and pototoes occumulate until their weight is enough to pull the sock free. Pototoes then foll en mosse to bottom of bog where their foll is further cushioned by sponge rubber pod on floor.



controls for...

GRAIN AERATION SYSTEMS

by George H. Foster

MARKETING research has shown that aeration systems can save the grain industry $15-3/4 million a year in storage and turning costs—if used properly and by as much as 90 percent of the industry.

Control systems, according to AMS engineers, are one way of seeing to it that aeration equipment operates effectively.

No matter how good an aeration system may be, its success still depends upon outside air temperature and humidity. Since no one can control these elements, AMS researchers have worked to improve the controls on aeration systems.

The author is an agricultural engineer in the Transportation & Facilities Research Division of AMS.

Several factors must be considered—the geographic area, the kind of grain, its depth, and the desired rate of cooling. Higher airflow is needed in the South, for example, because temperatures are higher and there is less desirable cooling weather. Also, wheat is more resistant to airflow than shelled corn or soybeans.

Aeration fans may be controlled either manually or automatically. Manual control is generally used in aerating grain in flat storages. Here, a complete temperature change can be made in two to five days if the weather is right.

When wheat or other small grains are aerated in tall upright tanks, slower cooling rates may be necessary to reduce power requirements. In vertical bins, it usually takes longer to cool the entire depth of the grain. As a result, automatic controls are almost essential. Besides offering a more efficient operation, controlled aeration systems require less labor. The fan can be allowed to run during nights, weekends, and holidays without attendance.

Automatic controls also help the operator take advantage of all the good weather. When low airflow rates are used, this is extremely important. All available aeration time is needed to reduce grain temperature before mold activity, insect infestation, and other forms of deterioration get started. Automatic controls also reduce some of the possibility of human error.

Automatic systems incorporate the same controls found in standard air-conditioning and heating units. All aeration control units have thermostats and humidistats. Time clocks, automatic timers, selector switches, pilot lights, and fan operation recorders may also be added if they are deemed necessary.

The thermostats can be designed for setting at a high or low limit. The high limit prevents the fan from running when the air is warmer than the grain. When aeration is begun, the thermostat is set 10 to 15 degrees lower than the grain temperature. As the grain is cooled, the setting is lowered until the desired final temperature is reached.

Some elevator operators feel that it is safe to hold grain until cold weather before aerating. This way the high limit thermostat can be set at a specific desired temperature and left there until cooling is completed.

The low-limit thermostats stop the fans when the temperature drops too low. Use of these, of course, is most common in the northern half of the U.S. They are usually set at about the freezing point, the recommended low grain temperature in most areas, and not changed.

With both a high-limit and low-

limit thermostat, the fan will operate only within a set temperature range, and final grain temperature within these limits is assured. AMS engineers point out, however, that the narrower the range, the less time the fan will run. And if the range is not close to normal outdoor temperatures at the time of operation, there will be little or no aeration.

The humidistat is used most often in the humid southern and eastern regions of the country. It prevents excessive aeration during periods of high relative humidity.

The average humidity is low enough in most parts of the country to cause no problem. But in humid regions it is necessary to stop fans at night and during rainy and foggy weather. In some areas, nonadjustable preset humidistats have proven successful.

Time clocks limit the operation of the aeration system to selected hours of the day, when weather conditions are most favorable. They also may be set to shut off the fan when its noise would be objectionable and during periods of peak electrical demands.

Pilot lights indicate when the fan is on and whether it is operating under automatic or manual control.

Another addition to the control system is a time meter to keep track of the total hours the fan is on.

A fan operation recorder not only indicates how long the fan is in operation but exactly when. The time of day when the controls turned the fan on and off can then be checked against a record of weather conditions for that period. Usually, this information is used for collecting test data.

Most suppliers of aeration systems also have controls available for their equipment. One of the leading manufacturers of controls markets a low-cost unit using a preset humidistat, a preset low-limit thermostat, and an adjustable high-limit thermostat.

Regardless of the type of control unit, it must be in perfect working order and properly set. If not, its effectiveness in selecting the proper weather conditions will be lost. Timing devices must be reset each time the electrical system is interrupted. Humidistats must be kept clean. And, sensing elements made of hair must be replaced as often as every two years. All of this means frequent inspections and cleaning.

The design of the enclosure and the location of the control panel are also important to the proper operation of the control system. The condition of the air around the control elements should be the same as that being moved through the grain. The control panel should not be located in especially dusty or windy locations. Good ventilation and shade are recommended.

Generally, commercial unit enclosures are not adequately ventilated for a sunny location. Additional ventilation is needed if heat-producing electrical units, such as recorder motors, transformers, or electrical control elements are used inside the enclosures.

Operating Grain Aeration Systems in Corn Belt

IF YOU live in the Corn Belt, here are some tips on how you can get the most out of your grain aeration system.

• Aerate early in the fall and keep the temperature of the grain close to the outside air.

This will prevent moisture migration. When grain is cooled completely before winter sets in, there is little danger of increasing the moisture of the grain near the surface where the air enters the bin. If the grain is aerated during the winter or if it is cooled to below freezing temperatures, slight increases in moisture occur in or near the surface. Then, as the damp grain becomes warmer during spring and summer, the risk of damage by heating, molds, and insects increases—unless there is further aeration.

• It also it wise to keep the grain as cool as possible throughout the storage period. This prevents insect activity and "sick" damage in wheat, and holds down mold damage in corn.

• In summer and early fall, fans should be operated day and night, except in foggy, rainy weather. Later in the year, when the air temperature is lower and the relative humidity higher, aeration should be limited to daylight hours on fair days.

Manual stopping and starting of fans works well in flat storages aerated at an airflow rate of 1/10 cubic feet per minute or more if a complete change in grain temperature can be made in less than a week. Otherwise, automatic controls are more reliable.

• A downward airflow is recommended when warm grain is aerated during subfreezing weather. Aeration with an upward airflow, however, is satisfactory when cooling is rapid enough to keep the grain temperature within 10° to 15° of the average outdoor temperature.

How long it takes to cool a bin of grain depends upon the airflow rate, the method of aeration, and the uniformity of air distribution. Usually, at an airflow of 1/10 c.f.m. per bushel, it requires about 80 hours in the summer, 120 hours in the fall, and 160 hours in the winter.

If the grain is cooled by stages or if it is aerated again in the spring and summer, fans will, of course, have to be run longer.

Merchandising Rice In Retail Food Stores

by Violet Davis Grubbs

HOW you display a retail item has a lot to do with how well it sells.

In recent years, rice producers and the rice industry as a whole have been concerned about large supplies, have wondered whether stores are making the most of their rice displays.

To find out what is being done to sell rice at the retail level, market analysts in the Market Development Research Division of AMS studied the merchandising practices of food retailers in Cleveland, Ohio.

They checked the type of rice sold and the amounts, the size and kind of containers and the place in the stores where it was displayed.

From all this they found that medium-size and small stores, together, sell just as much rice as the large supermarkets.

Small stores sell mostly regular rice, possibly because many of these are located in low-income areas and regular rice is lower in cost. Larger stores, in contrast, retail nearly as much processed (enriched) and precooked rice as regular rice.

Although the trend toward more convenience items has also included rice in its sweep, far more regular rice is still sold than either processed or precooked rice. Regular rice accounted for 60 percent of the sales; processed rice for 23 percent; and precooked rice, 17 percent.

All three types of rice were sold in a wide variety of packages—cellophane bags, window-front cartons, and solid cartons. There were 7 sizes, ranging from 5 ounces to 2 pounds.

Most consumers appear to prefer cartoned rice. Rice in solid and window-front cartons accounted for 76 percent of all rice sales in the Cleveland stores.

Interestingly enough, regular rice was usually packaged in cellophane bags and windowed boxes; processed and precooked rice in solid boxes.

The 1-pound package led in the number of packages sold, but it was followed closely by the 2-pound container. This probably ties directly to the fact that regular rice sales were highest—and this kind of rice comes chiefly in 1- and 2-pound packages.

Processed rice is usually offered in 14- and 28-ounce cartons; precooked rice in 5- and 15-ounce packages.

Sales of the various sized cartons and bags were directly related to the size of their display space. As display space increased, so did the quantity of rice sold.

While most retailers offered rice only in regular shelf displays, several stores in each size group concentrated on island displays. A few, of course, used both special island and regular shelf displays.

About 45 percent of the retailers displayed rice in the rear of their stores; 38 percent put it half-way back; and 21 percent had it right in front. Some stores offered rice for sale in two places, either at two shelf positions or on a shelf plus an island display.

It's hard to say how much this placement affected total sales. A lot of other things also influence consumer purchases. But in the Cleveland stores surveyed, rear-store displays sold a weekly average of 134 pounds of rice; displays in middle locations sold 122 pounds; and displays near the front of the store averaged 110 pounds.

With the use of special promotions, competitive prices, and attractive packages, it may be possible for these Cleveland retailers to increase their rice sales wherever they are located.

At any rate, one thing is certain. The better the merchandising practices, the more rice is sold. And that's what AMS researchers are seeking—ways to improve the sales of farm-produced rice and thus move more of the abundant supply onto the market.

The author is a staff member of the Market Development Research Division of AMS.

$6 Billion for Cigarettes

Cigarette production in the U. S. will set a new record in 1959. It is expected to reach an output of 485 billion cigarettes—15 billion more than a year earlier. According to Agricultural Marketing Service economists, 96 percent of the production will go to domestic consumers. The remaining 4 percent will be exported.

People in the United States probably will spend a record $6 billion on cigarettes this year. This higher outlay reflects a rather general increase in retail prices to absorb increased State and local excise taxes and the added cost of filter tips.

Half or more of all cigarettes manufactured in the U. S. in 1959 will be filter tipped. Last year, they accounted for 45 percent.

Packing Costs for APPALACHIAN APPLES

by Jules V. Powell

THE apple packer who intends to stay in business must keep a sharp eye on quality and costs. If he doesn't, his apples will be less able to compete with those from other parts of the country.

In the Appalachian area, growers have focused their attention on increasing the efficiency of their packing operation through improved work methods and new equipment. Many have put in mechanized lines and adopted more up-to-date methods; many others are considering such changes.

To assist the Appalachian packer in selecting the best possible improvements, researchers in the Agricultural Marketing Service have studied currently used methods and equipment.

One of the most striking things they found was the wide variety in packing methods and costs. For example, one plant had costs of 0.4 cent a unit to staple carton flaps by machine; in another, using hand methods, costs were 4.7 cents for the same job.

In almost all cases, a well-organized machine operation was more efficient and less costly than a manual packing line. The worker filling tray-pack cartons with a machine could pack three cartons to every one packed without such equipment. He could fill eight instead of six cartons of either 4-pound or 5-pound bags by using commercial machines.

However, the efficiency of the packing operation does not always result in reduced costs. Plants having semi-automatic packing and bagging machines and paying packers a piece rate of 10 or 12 cents a carton probably would have higher labor and machinery costs than plants using manual methods and paying an hourly wage.

Actually, it's the method of payment and the going wage rate that largely determine packing costs. These, in turn, depend upon the location of the plant and the competition for labor in the area.

A lot of other things besides wage rates affect total packing costs—the volume of apples packed, the length of the packing season, and the initial and operating costs of the mechanical equipment. It is also necessary to take into account the type of packing operation—that is, how much of what type of containers is used.

Again, take as an example, two plants that pack 50,000 bushels during a 200-hour season. One plant uses hand methods of packing; the other has semi-automatic tray packers and bagging machines. Both pay $1 an hour.

Total packing labor and machinery costs per tray-pack carton would be 16.3 cents in Plant 1 compared with 15.3 cents in Plant 2. But, Plant 1 would save almost 7 cents on each carton of 4-pound bags and almost 2 cents on each carton of 5-pound bags by using hand methods rather than bagging machines.

So, even though the tray-pack cartons cost a little more for Plant 1, this disadvantage is more than offset by the large savings in manually packing the 4- and 5-pound bags.

As volume of output and length of season increase, however, it becomes more advantageous to use mechanized packing equipment. In large plants packing 250,000 bushels during a 1,400-hour season, tray-pack machines would enable the packinghouse to hold unit costs to 14.4 cents; hand methods average 17.8 cents. Using commercial bagging machines to pack cartons of 4-pound bags, the packinghouse would pay only 26.8 cents a unit compared with 28.2 cents by hand methods. Cartons of 5-pound bags would cost 22.4 cents if bagged mechanically, 24.5 cents by hand.

This means possible savings of 3 cents a tray-pack and 2 cents a carton of bags by the large-scale use of machine packing methods.

These examples show that many different factors affect the cost of packing Appalachian apples. Which way to pack or what method of wage payment to use depends upon the particular packing operation. The final selection must be made on an individual basis. If the packer-grower carefully studies his methods and costs in relation to his present and expected volume, the decision should not be too difficult.

Mr. Powell is a staff member of the Marketing Economics Division of AMS. This article is based on his study of "Costs of Marketing Appalachian Apples," MRR 300.

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The Changing Market

Reducing Handling Costs

Word from the newly opened wholesale food distribution center in Philadelphia indicates that savings in handling costs may be even greater than anticipated. Two fruit and vegetable dealers who made the move from Dock Street to the new market have kept tabs on handling costs in both locations. Here's what they report:

Dealer number one estimates his savings in unloading and stacking costs at 59 cents a ton. He handles about 10,000 tons of produce a year, which gives him a potential saving of nearly $6,000 annually. That's about two-thirds the rent he pays on his two store units.

Dealer number two looks forward to even more spectacular savings. He expects to save well over $25,000 a year in unloading and stacking. And this he considers a conservative estimate.

Because of traffic congestion, poor design of buildings, and complete lack of space at the old Dock Street market, no time-saving equipment could be used; it was all hand-labor. As a result, handling costs were high.

Firm number two paid $1.69 a ton in handling charges on Dock Street. At the new market, using four-wheel trucks and a dock board, these costs have been cut to 31 cents for both firms studied.

The savings of these two firms already account for one-fifth of the predicted savings on in-store handling for the entire fruit and vegetable market.

As yet, however, many firms have not made use of new handling methods or more efficient equipment. When they do, handling costs at the fruit and vegetable market will be much less and savings much more than had been originally anticipated.

It should be possible for produce men at the Philadelphia market to cut the 31-cent handling cost still more through improved handling operations.

Maine Potato Program

(continued from page 10)

It also brought them forward in the minds of processors. More than 2,150,000 hundredweight of Maine potatoes were used for food processing last year—35 percent more than the year before.

This same type of promotion was conducted within the hotel and restaurant trade. To promote baking use, Maine russet potatoes (baked, of course) were served at the Hotel and Restaurant Convention.

Baked potatoes were also featured at the Eastern States Exposition, and a consumer poll taken. This gave the consumer a chance to tell what she did and didn't like about Maine potatoes and gave growers, packers, and merchandisers a better idea of what the consumer wants.

Protein Content of Wheat

A new rapid method for determining the protein content of wheat and flour samples has been developed by Agricultural Marketing Service scientists.

Louis Feinstein and Joe R. Hart of the Market Quality Research Division, Agricultural Marketing Service, use a sulfosalicylic acid solution and a colorimeter to get quick, accurate results.

The chief advantage of the Feinstein-Hart method is its simplicity. The protein is merely separated from the sample and suspended in the sulfosalicylic acid solution. A photoelectric measurement is then made with a colorimeter.

Through the use of equations or prepared tables, the colorimeter reading of optical density is interpreted in terms of protein content.

This process works well with any pure wheat sample, regardless of where it is grown and under what weather and soil conditions. The only thing to watch out for is that the wheat has been ground to uniform particles.

If this has been done and the testing process carefully conducted, the Feinstein-Hart method is every bit as reliable as the more complicated Kjeldahl analysis.

Besides its speed and the accuracy of its findings, the new method offers several other research advantages. It involves no dangerous concentration of reagents, and it requires no heating or distilling.